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June 21, 2010

Ms. Gina L. Kirkland
Water Quality Standards Coordinator
Bureau of Water
2600 Bull Street
Columbia, SC 29201

Re: Triennial Water Quality Standards Review

Dear Ms. Kirkland:

Section C (4)(b)(2) addresses the instream critical flow conditions the Department uses when setting NPDES permit limitations. Specifically, the standards currently state:

> *(1) The applicable critical flow conditions for human health shall be defined as annual average flow for carcinogens, 7Q10 (or 30Q5 if provided by the applicant) for noncarcinogens, or tidal conditions as determined by the Department. The applicable critical flow conditions for organoleptic criteria shall be defined as annual average flow or tidal conditions as determined by the Department. The numeric criteria of this regulation are not applicable to waters of the State when the flow rate is less than the annual average flow for carcinogens or 7Q10 (or 30Q5 if provided by the applicant) for noncarcinogens, except as prescribed below.*
>
> *(2) The Department shall consider conditions that are comparable to or more stringent than annual average flow, 7Q10, or 30Q5 (if provided by the applicant) where appropriate to protect the classified and existing uses, such as below dams and in tidal situations. Only those situations where the use of annual average flow, or 7Q10, or 30Q5 (if provided by the applicant) are determined to be impracticable, inappropriate, or insufficiently protective of human health uses shall be considered as a situation in which the Department may consider other flow conditions.*

In tidal situations, the permitting staff has little guidance except to use a flow that is "comparable to or more stringent than annual average flow, 7Q10, or 30Q5". Recently, staff has taken the position that they should use the flow that occurs at **a moment** in the tidal cycle when little or no dilution is available. This is inconsistent with the approach used in free flowing freshwater streams. R.61-68 should be changed to be more specific.

In free flowing freshwater streams, the Department uses the 7Q10 flow, which is defined as *"the annual minimum **seven day average flow** rate that occurs with an average frequency of once in ten years as published or verified by the U. S. Geological Survey (USGS) or an estimate extrapolated from published or verified USGS data."* If one were to look at actual stream data, one would see many days when the average flow for that day was lower than the 7Q10. Further, if one were to look at the hourly flows during that day, one would see hourly flows that were even lower than the lowest daily average flow. Since the 7Q10 flow is "minimum seven day **average** flow rate", a similar approach should be devised for tidal situations.

This issue becomes critical when setting toxicity limitations. The USEPA has acknowledged that toxicity is a function of concentration, exposure, and frequency. It is scientifically indefensible to use the worst moment in the worst day as the basis for setting a permit limitation for a test such as toxicity that is designed to evaluate an effect over a 24-hour, 48-hour, or 7-day period. If the Department wants to use the dilution that occurs for only that worst moment, then it must use a toxicity test that similarly lasts only that moment.

One approach would be to use the average daily tidal flow. That should be roughly equivalent to a mid-high tide or a mid-low tide, which can be calculated using models such as CORMIX.

Even though tides in South Carolina can vary somewhat, they are relatively constant except for exceptional tides such as spring tides. Over a seven-day period, the variability is evened out similar to the variability in freshwater streams over a seven-day period.

I suggest modifying Section C (4)(b)(2) to read as follows:

> *(2) The Department shall consider conditions that are comparable to or more stringent than annual average flow, 7Q10, or 30Q5 (if provided by the applicant) where appropriate to protect the classified and existing uses, such as below dams and in tidal situations. **In tidal situations, the average daily flow shall be used; the average daily flow shall be the average of the mid-high tide and the mid-low tide flows.** Only those situations where the use of annual average flow, or 7Q10, or 30Q5 (if provided by the applicant) are determined to be impracticable, inappropriate, or insufficiently protective of human health uses shall be considered as a situation in which the Department may consider other flow conditions.*

Thank you for the opportunity to comment on this important issue.

Sincerely,

Robert G. Gross, P.E., DEE
President